



George C. Marshall Space Flight Center  
Marshall Space Flight Center, Alabama 35812



Materials and Processes  
Laboratory, EM01

Metals Engineering  
Branch, EM30

EM30-WI-007  
02/11/2005

## ORGANIZATIONAL WORK INSTRUCTION

EM30

# PLATING PROCEDURES

## Baseline

**RELEASE  
AUTHORITY**

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### DOCUMENT HISTORY LOG

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## 1 SCOPE

- 1.1 **SCOPE:** This document provides plating procedures and requirements for the Materials and Processes Laboratory, Metal Engineering Branch, Metallics Engineering Team within the scope defined by MPD 1280.1.
- 1.2 **PURPOSE:** The purpose of this document is to outline the basic workflow and procedures utilized in the Metallics Engineering Team plating area.
- 1.3 **APPLICABILITY:** This document is applicable to the Materials and Processes Laboratory, Metal Engineering Branch, Metallics Engineering Team and support personnel who engage in plating activities.

## 2 APPLICABLE DOCUMENTS

- 2.1 EM30-WI-002 EM30 Work Tracking, Product Traceability and Control, and Data Control
- 2.2 MPR 1040.3 MSFC Emergency Plan
- 2.3 MPR 1840.2 MSFC Hazard Communication Program
- 2.4 MPR 8730.5 Control of Inspection, Measuring, and Test Equipment
- 2.5 MWI 8550.1 Waste Management
- 2.6 MWI 8550.2 Storm Water Management
- 2.7 MWI 8550.3 Wastewater Compliance
- 2.8 MWI 8550.4 Air Emissions Compliance
- 2.9 MWI 8550.5 Hazardous Material Management
- 2.10 Operating instructions provided by equipment and plating bath manufacturers.
- 2.11 Air Force Technical Manual T.O. 33K6-4-15-1 "Technical Manual: Calibration Procedure for Micrometers, Micrometer Heads, and Depth Micrometers" (dated 30 April 1997).
- 2.12 Air Force Technical Manual T.O. 33K6-4-552-1 "Technical Manual: Calibration Procedure for Dial and Venier Calipers, Inside and Outside Dimensions to 72 Inch and Depth Dimensions to 12 Inches" (dated 30 March 1997).

## 3 DEFINITIONS

- 3.1 None.

## 4 INSTRUCTIONS

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- 4.1 **GENERAL:** Work performed and data generated in the process of plating shall be documented and controlled.
- 4.2 **REQUESTS FOR WORK:** The EM30 Metal Engineering Branch, Metallics Engineering Plating Work Request Form, found on the Organizational World Wide Web site, (<http://ed33mmtfa/PublicMMTF/WorkRequest.aspx/>), must be completed prior to the start of work.
  - 4.2.1 The work request form shall be filled out by the requester and/or by Organizational personnel.
  - 4.2.2 The request for work shall be approved by EM30 Branch/Team level management or their designee and assigned to appropriate personnel.
- 4.3 **WORK ACCOMPLISHMENT:** The plating work shall be accomplished by assigned personnel based on the customer technical requirements.
  - 4.3.1 The plating shall be performed to customer specified requirements.
  - 4.3.2 Plating parameters shall be documented on appropriate log sheet, form, or other document as required for a specific task.
  - 4.3.3 Plated samples shall be inspected according to customer requirements and/or any applicable standards.
  - 4.3.4 Witness coupons created during the production cycle shall be labeled with the work request number and any other necessary process identification numbers and stored as quality records.
- 4.4 **PLATING EQUIPMENT CALIBRATION:** Equipment shall be calibrated when calibration is required to meet the technical requirements of the plating work being performed. Necessary equipment calibration shall meet the requirements of MPR 8730.5.
  - 4.4.1 Calibration documentation of category I and II plating equipment shall be maintained on the Marshall Calibration Management System website (<http://inside.msfc.nasa.gov/CALLAB/>).
  - 4.4.2 The Metals Engineering Branch, Metallic Materials Engineering Team Calibration Contact shall maintain a log of Category IV and V equipment in the Calibration Logbook.
    - 4.4.2.1 Category IV equipment may include an indicator.
    - 4.4.2.2 Category IV equipment shall be calibrated as defined in the Original Equipment Manufacturer supplied operations or service manuals or as specified per paragraph 2.12 and 2.13.
  - 4.4.3 Equipment in the EM30 plating areas are considered “Category III – Not Calibrated” unless identified otherwise per paragraphs 4.4.1 or 4.4.2. Category III equipment and instrumentation shall be used for applications where substantiated measurement accuracy is not

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required and/or for “indication only” purposes of non-hazardous, non-critical applications. Category III equipment shall not include an indicator or be maintained in a logbook.

4.4.4 Each work request shall be evaluated to determine the equipment calibration needed to meet the technical requirements. Equipment shall be re-categorized as needed.

4.4.5 A list of calibrated equipment used in completion of a work request shall be documented. Calibrated equipment listings shall be documented on the Electronic Work Request System Form available at <http://ed33mmtfa/PublicMMTF/WorkRequest.aspx/>, or as an attachment, and in the appropriate plating tank notebooks.

4.4.6 Documentation and verification of Category IV calibrations shall be recorded and attached to the completed work order.

4.5 **GENERATION OF RESULTS:** If required, a final report or compilation of relevant data shall be organized from all available information.

4.6 **DATA REVIEW, APPROVAL, AND REPORTING:** Reports, memos, and data shall be reviewed, approved, and reported to the customer in accordance with standard Organizational practices described in EM30-WI-002.

4.7 **QUALITY RECORD ARCHIVING:** All quality records produced in fulfillment of customer requirements described in the work request shall be stored in accordance with standard Organizational practices found in EM30-WI-002.

4.8 **SAMPLE DISPOSITION:** All samples and/or non-consumable Customer supplied materials shall be returned to the Customer or stored in accordance with standard Organizational practices described in EM30-WI-002.

4.9 **WORK REQUEST CLOSE OUT:** Once all applicable work has been completed, data distributed, samples released, and quality records archived, the work request shall be closed out in accordance with standard Organizational practices described in EM30-WI-002.

## 5 NOTES

5.1 None.

## 6 SAFETY PRECAUTIONS AND WARNING NOTES

6.1 All plating personnel shall adhere to applicable material safety data sheets (MSDS) provided by chemical suppliers.

6.2 All plating personnel shall adhere to safety instructions provided by equipment manufacturers.

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- 6.3 All liquid and solid waste generated from plating activities shall be considered hazardous waste and disposed of according to applicable procedures found in MPR 1700.1 and MPR 1840.3.
- 6.4 Safety glasses and non-absorbent gloves, as a minimum, shall be worn under the following conditions:
  - 6.4.1 Measuring, mixing, transferring, combining, or disposing of any chemical.
  - 6.4.2 Adding chemicals to a plating tank.
  - 6.4.3 Taking a solution sample from a plating tank.
  - 6.4.4 Adding anodes to an anode basket.
  - 6.4.5 Carrying chemicals to/from their storage location.
- 6.5 Safety glasses, non-absorbent gloves, and lab coat, apron, or similar shall be worn under the following conditions:
  - 6.5.1 Placing parts into or removing parts from a plating tank.
  - 6.5.2 Adding chemicals to a plating tank when the tank cover is not in place.
  - 6.5.3 Working with concentrated acids.
  - 6.5.4 During tank cleaning operations that involve acids.
  - 6.5.5 During solution pumping operations.
- 6.6 The room ventilation exhaust system in Room 1322 (minimum of one set of fans) must be operating when any plating or cleaning solution temperature is  $\geq 150$  degrees F, for tanks  $\geq 50$  gallons.
- 6.7 Steel toe shoes shall be worn when operations involve moving heavy objects by hand truck, pallet jack, forklift, overhead crane, or similar handling device.

## 7 APPENDICES, DATA, REPORTS, AND FORMS

- 7.1 None

## 8 QUALITY RECORDS

- 8.1 The following listing includes EM30 Quality Records that are collected and saved during plating activities.
  - 8.1.1 EM30 Group Memoranda
  - 8.1.2 EM30 plating tank notebooks
  - 8.1.4 Plating calibration verification reports

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- 8.2 All schedules pertaining to EM30 Quality Record retention and disposition are compiled in the EM30 Quality Records Listing located on the master list of the EM30 group website (<http://maptis.nasa.gov/em30/em30masterlist.html>)

## 9 TOOLS, EQUIPMENT, AND MATERIALS

- 9.1 Not Applicable.

## 10 PERSONNEL TRAINING AND CERTIFICATION

- 10.1 The primary operator of each plating facility utilized by EM30 personnel shall receive operations training from one or both of the following sources.
- 10.1.1 Previous primary plating facility operator.
  - 10.1.2 Plating facility manufacturers training representative.
- 10.2 Plating operations will not be allowed until basic safety, maintenance, and operational readiness have been achieved by the operator.

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## 1 FLOW DIAGRAM

